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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/783,621

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Anoop Mukker

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INTEL/BLAKELY

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EXAMINER

MCFADDEN, MICHAEL B

ART UNIT

PAPER NUMBER

2188

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/783,621	<b>Applicant(s)</b> MUKKER ET AL.	
	<b>Examiner</b> Michael B. McFadden	<b>Art Unit</b> 2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4,6-8,10-16,18-22 and 24-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4,6-8,10-16,18-22 and 24-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### **Request for Continued Examination**

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 19 March 2008 has been entered.

### **Status of Claims**

2. Claims 1-4, 6-8, 10-16, 18-22, and 24-34 are pending in the Application.
3. Claims 5, 9, 17, 23, and 35-40 are cancelled.

### **Response to Amendment**

4. Applicant's arguments filed on 19 March 2008 have been fully considered but they are not persuasive.

### **Claim Objections**

5. Claims 10-12 are objected to because of the following informalities: claim 10 depends on the canceled claim 9. Appropriate correction is required. For the following rejection, claim 10 is treated as if depends on claim 8.

**Claim Rejections - 35 USC § 103**

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-4, 6-8, 10-16, 18-22, and 24-34 are rejected under 35 U.S.C. 103(a) as being anticipated by Cai et al. (US Patent No. 6,349,363 (herein after Cai)) and further in view of Gaither (US Patent No. 6,434,672).

8. **Regarding Claims 1, 7, 13, 19, and 25**, Cai discloses partitioning a cache array into one or more special-purpose entries and one or more general-purpose entries (**Cai: Column 2, Lines 57-60**), wherein special-purpose entries are only allocated for one or more streams having a particular stream ID, wherein the stream ID is stored outside the cache array; (**Cai: Column 3, Lines 43-49 and Column 4, Lines 25-42**) wherein the special-purpose entries to use a first cache replacement algorithm and the one or more general-purpose entries to use a second cache replacement algorithm (**The cache must inherently utilize a replacement algorithm for every cache it controls. The claim does not require that the first and second algorithms are distinctly different algorithms. Therefore, Cai teaches using a first algorithm for the first cache and a second algorithm for the second.**); determining if a cross-access scenario exists between at least one of the one or more special purpose entries and at least one of the

one or more general purpose entries. **(Cai: Column 6, Lines 17-19) Snooping allows the caches to know if they contain the same information as another cache in the same system and if a write operation is being performed on the information.**

**Therefore, snooping does determine if a cross access scenario exists.**

9. Cai fails to disclose if the cross-access scenario exists, permitting cross-access of data between the at least one of the one or more special-purpose entries and the at least one of the one or more general-purpose entries that relate to the cross-access scenario.

10. Gaither discloses if the cross-access scenario exists, permitting cross-access of data between the at least one of the one or more special-purpose entries and the at least one of the one or more general-purpose entries that relate to the cross-access scenario. **(Gaither: Column 4, Lines 57-62 and Column 5, Lines 43-47.)**

11. Cai and Gaither are analogous art because they are from the same field of endeavor, memory architecture.

12. At the time of the invention it would have been obvious to one of ordinary skill in the art to include the snarf capability of Gaither in the system of Cai.

13. The motivation for doing so would have been ensuring the coherency of the cached data and therefore improving cache efficiency. **(Gaither: Column 4, Lines 60-62.)**

14. Therefore it would have been obvious to include the snarf capability of Gaither in the system of Cai for the benefit of ensuring the coherency of the cached data and therefore improving cache efficiency to obtain the invention as specified in claim 1.

15. **Regarding Claims 2, 8, 14, 20, and 30**, Cai and Gaither disclose allocating the one or more special purpose entries based on the particular stream ID and a particular input address. **(Cai: Column 3, Lines 43-49 and Column 4, Lines 25-42 and Figure 3, Element 162)**. The EID coupled with input address locate where the entries, in the cache, will be placed. A cache input address is inherent in accessing stored data because that is how data is located in a cache.

16. **Regarding Claims 3, 15, and 21**, Cai and Gaither disclose storing data from the one or more streams in the one or more special-purpose entries when the particular stream ID and the particular input address match a predetermined stream ID and a predetermined input address; and storing data from the one or more streams in the one or more general-purpose entries when the particular stream ID and the particular input address do not match the predetermined stream ID and the predetermined input address. **(Cai: Column 3, Lines 43-49 and Column 4, Lines 25-42 and Figure 3, Element 162)**. The EID coupled with input address locate where the entries, in the cache, will be placed. A cache input address is inherent in accessing stored data because that is how data is located in a cache. The general-purpose entries would be stored in the default cache with the “default EID identifier”.

17. **Regarding Claims 4, 10, 16, 22, 28, 29, 31, and 32**, Cai and Gaither disclose determining when the particular stream ID and the particular input address match the predetermined stream ID and the predetermined input address using special-purpose control logic. **(Cai: Column 3, Lines 1-13 and Column 4, Lines 9-25 and Column 5, Line 62 – Column 6, Line 7)**. The memory controller manages multiple cache

**partitions and is able to differentiate multiple EIDs. Being able to differentiate between more than two EIDs shows that special logic is used to determine the cache location from the address and EID.**

18. **Regarding Claims 6, 12, 18, 24, 26, 34,** Cai and Gaither disclose wherein the special-purpose stream includes a data stream and wherein the system contains an I/O hub interface connected to a bus, a processor interface; and a host AGP controller connected to the system memory controller via the bus; wherein the cache array receives the cache operation requesting data via the one or more interfaces, and returns a cache hit in response to the cache operation, wherein the cache has a pending fetch for the data in response to a prior cache operation requesting the data.

**(Cai: Column 6, Line 60 – Column 7, Line 5)**

19. **Regarding Claim 11 and 33,** Cai and Gaither disclose a DRAM controller integrated with the cache memory array. **(Cai: Column 5, Lines 12-16) A DRAM is controlled by a DRAM controller.**

20. **Regarding Claim 27,** Cai and Gaither disclose wherein the processor interface connects a plurality of processors **(Figure 2 and Column 6, Line 44 – Column 7, Line 14),** the plurality of processors including a 16-bit processor and a 64-bit processor.

**From Figure 2 it can be seen that the caches are connected to a memory hub.**

**Also connected to the hub are many devices. The text also discloses the caches connected to the multiple devices and controllers. The various devices and controllers inherently have their own processors. Therefore disclosing a plurality**

**of processors. The size of the processors is a design choice and therefore does not carry patentable weight.**

**Response to Arguments**

21. Applicant's arguments filed on 19 March 2008 have been fully considered but they are not persuasive.

22. **Regarding Claim 1**, the Applicant contends that Cai fails to disclose determining if there is a cross-access scenario between caches. **However, as previously stated snooping allows the caches to know if they contain the same information as another cache in the same system and if a write operation is being performed on the information. Therefore, snooping does determine if a cross access scenario exists.** The Applicant also contends that snarfing does not describe permitting cross-access between caches or sections of a cache. **However, snarfing, as described by the Applicant, updates its own copy of a memory location when it is modified in main memory. This would result in two copies of the same location to be present in two different caches. Therefore, snarfing would permit, and require, that a cross-access scenario exists.** The Applicant further contends that neither reference teaches that each cache has its own replacement algorithm. **However, each cache must inherently possess a replacement algorithm. The claim does not require that the algorithm used by the first cache be different from that of the second. Therefore, Cai and Gaither do disclose that each cache would have its own replacement algorithm.**



23. Regarding all other Claims not specifically traversed above and whose rejections were upheld, the Applicant contends that the listed claims are allowable by virtue of their dependence on other allowable claims. As this dependence is the sole rationale put forth for the allowability of said dependent claims, the Applicant is directed to the Examiner's remarks above. Additionally, any other arguments the Applicant made that were not specifically addressed in this Office Action appeared to directly rely on an argument presented elsewhere in the Applicant's response that was traversed, rendered moot or found persuasive above.

### **Conclusion**

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael B. McFadden whose telephone number is (571)272-8013. The examiner can normally be reached on Monday-Friday 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sam Sough can be reached on (571)272-6799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Supervisory Patent Examiner, Art Unit 2188  
06/06/08

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